

[0026] FIG. 5 is a front perspective view of the display module of FIG. 1 with the interface fully folded and decoupled from a mobile telephone.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0027] A miniature display module or other accessory module for use as an accessory with a handheld computer and a variety of other host devices is described. The miniature display module may include a display screen for displaying information, an interface for communicating with host devices, and non-volatile memory (or other memory devices) for storing information. To couple to a host device for data communication, the user may either fold the interface behind the display for attachment to certain host devices, or the user may extend the interface for insertion into certain other host devices. The disclosure below discusses a preferred display module embodiment, however, it should be noted that the characteristics and features of the display modules disclosed are equally applicable to other types of accessory devices even if a display is not incorporated therein.

[0028] When used as an accessory to a host device having an interface slot for receiving the display module data interface, such as a handheld computer, the interface housing may be extended for insertion into an interface slot such that the display module may be in data communication with the host device data interface. Alternatively, when used as an accessory with a host device, such as a wristband, having a cavity for receiving the folded display module, the foldable portion is folded such that the display module data interface is in data communication with the host device data interface. For the data interface of the present invention, either

electrical interconnects make secure electrical connection, an optical interface may be located so as to permit reliable data transfer or a radio frequency (RF) transceiver may be used to provide data communications to a host device. The data interface may comprise any suitable format, such as CAN (Controller Area Network), but is preferably compatible with a Secure Digital (SD) interface, a multimedia card (MMC) interface, or the like.

[0029] An exemplary embodiment of the display module relates to a handheld computer having an interface slot to receive the display module interface. The display module data interface, for example a Secure Digital (SD) interface, is configured to be removably connectable to the handheld computer and to communicate data between the host device and the display module. The display module includes memory and display control circuitry. Further, the display device includes a power source, preferably fed by a battery, but is alternatively fed by the host device through an electrical interface. Similarly, the display module is removably connectable with a variety of host devices that can include, but are not limited to any compatible device, such as handheld computers, screen projectors, e-books, games, toys, cameras, MP3 players, home controls, car controls, remote controls, mobile telephones, and watches.

[0030] The exemplary embodiments of the present invention permit the user to enter important information and to set desired customized preferences using a host device, such as a handheld computer, and the display module stores this information in non-volatile memory (NVM) or any other memory devices. This capability permits the user to use the display module with a variety of host devices without the need to repetitively enter key information, such as identification data and time, into numerous host devices. Through its interface, the display module can present that stored

information to other host devices. Via the display module, host devices may also transfer data, such as maintenance schedules, to the calendar program database of a handheld computer.

[0031] In an alternative exemplary embodiment, an accessory module may be a global positioning system (GPS) module, a modem module, a Bluetooth transceiver module, an IEEE 802.11 module, an infrared module, a scanner module, or the like. The accessory module is foldable (see FIGs. 3A-3C, for example) and can be used in either the folded or unfolded state depending on the configuration of the host device to which it is connected. Further, the accessory module may be folded for compactness and portability. Further still, the accessory may be folded to provide protection of the device and contacts.

[0032] Another exemplary embodiment relates to a wearable host device that has no data processing capability, such as a watch wristband configured for receiving a display module. The wearable host device includes a cavity for accepting the display module. The display module preferably has a foldable portion such that the footprint of the cavity has approximately the same area as the viewable area of the display module. The display module is preferably capable of receiving user input and retaining and displaying information while attached to the wearable host device. In a preferred embodiment, the wearable accessory includes a power source, such as a battery or solar cells, to supply energy to the display module.

[0033] There are two modes for coupling the display module to a host device. In a first mode, the display module interface housing extends for insertion into the host device interface slot. A host device adapted to this first mode, such as a handheld computer, includes a housing and an interface slot in the housing to receive the extended display module